CLAIMS

What is claimed is:

1. A method for separating a desired analyte from a fluid sample, the method comprising the steps of:

a) introducing the sample into a cartridge having:

i) a sample flow path; and

ii) a lysing chamber in the sample flow path, wherein the lysing chamber contains at least one filter for separating cells or viruses from the sample;

b) forcing the sample to flow through the sample flow path, thereby capturing the cells or viruses with the at least one filter as the sample flows through the chamber, wherein the ratio of the volume of sample forced to flow through the chamber to the volume capacity of the chamber is at least 2:1, and wherein the volume of sample forced to flow through the chamber is at least 100 µl;

c) disrupting the captured cells or viruses to release the analyte therefrom; and

d) eluting the analyte from the chamber.

2. The method of claim 1, wherein the ratio of the volume of sample forced to flow through the chamber to the volume capacity of the chamber is at least 5:1.

3. The method of claim 1, wherein the volume of sample forced to flow through the chamber is at least 1 ml.

4. The method of claim 1, wherein the step of disrupting the cells or viruses comprises agitating beads in the chamber.

5. The method of claim 4, wherein the beads have a binding affinity for the cells or viruses to be disrupted, and wherein the method further comprises the step of binding the cells or viruses to the beads.

6. The method of claim 4, wherein the beads have a binding affinity for the analyte, and wherein the method further comprises the step of binding the analyte to the beads.

7. The method of claim 1, wherein the lysing chamber contains a first set of beads for binding the cells or viruses and a second set of beads for rupturing the cells or viruses, the method further comprises the step of binding the cells or viruses to the first set of beads, and the step of disrupting the cells or viruses comprises rupturing the cells or viruses with the second set of beads.

8. The method of claim 1, wherein step of disrupting the cells or viruses comprises sonicating the chamber.

9. The method of claim 1, wherein step of disrupting the cells or viruses comprises heating the chamber.

10. The method of claim 1, further comprising the step of sonicating the chamber while forcing the sample to flow through the chamber.

11. The method of claim 1, wherein the step of eluting the analyte is preceded by the step of forcing a wash fluid to flow through the chamber while sonicating the chamber.

12. The method of claim 1, further comprising the step of sonicating the chamber while eluting the analyte.

13. The method of claim 1, wherein the cartridge has a first filter in the sample flow path for filtering coarse material from the sample and a second filter in the lysing chamber for separating the cells or viruses from the sample, the second filter having a smaller average pore size than the first filter, and wherein the step of forcing the sample to flow through the sample flow path comprises forcing the sample to flow through the first filter, thereby filtering the coarse material from the sample, prior to forcing the sample to flow through the second filter.